FACTORS AFFECTING THE STABILITY OF JOB ATTITUDES IN LONG-TERM ISOLATED GROUPS

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Navy Medical Neuropsychiatric Research Unit
San Diego, California

January 1970

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REPORT NO. 70-13

NAVY MEDICAL

NEUROPSYCHIATRIC RESEARCH UNIT

SAN DIEGO, CALIFORNIA 92152

BUREAU OF MEDICINE AND SURGERY DEPARTMENT OF THE NAVY

WASHINGTON, D.C. 20390

UNCLASSIFIED

Security Classification

DOCUMENT CONTROL DATA - R & D

Security classification of title, body of abstract and indexing annotation must be entered when the overall report is classified)

1 ORIGINATING ACTIVITY (Corporate author)	2a. REPORT SECURITY CLASSIFICATION
Navy Medical Neuropsychiatric Research Unit San Diego, California 92152	UNCLASSIFIED
	2b. GROUP

3 REPORT TITLE

Factors Affecting the Stability of Job Attitudes in Long-Term Isolated Groups

4 DESCRIPTIVE NOTES (Type of report and inclusive dates)

5 AUTHOR(S) (First name, middle initial, last name)

D. H. Ryman and E. K. Eric Gunderson

6 REPORT DATE	7a. TOTAL NO OF PAGES	7b. NO OF REFS
January 1970	14 17	3

8a. CONTRACT OR GRANT NO	9a. ORIGINATOR'S REPORT NUMBER(S)
b PROJECT NO MF51.524.002-5015DX5F	70-13
c.	9b. OTHER REPORT NO(S) (Any other numbers that may be assigned this report)
d	

10 DISTRIBUTION STATEMENT

Approved for public release, distribution unlimited.

11. SUPPLEMENTARY NOTES	12 SPONSORING MILITARY ACTIVITY
	Bureau of Medicine and Surgery Department of the Navy Washington, D. C. 20373

13 ABSTRACT

Job attitudes of participants in the U.S. Antarctic research program were measured on three occasions over 18 months. Subjects were 231 Navy enlisted men and 140 civilian scientists and technicians. Job Morale and Job Importance measures were highly stable for the scientist group and much less stable for the Navy group. The Job Morale and Job Importance measures became more interdependent over time for the civilians, but less so for Navy construction personnel. Navy men showed significant deterioration in morale throught the winter while scientists did not. Occupational role was seen to be an important determinant of job attitudes during long-term isolation.

DD FORM 1 NOV 65 1473 (PAGE 1) PLATE NO. 21856

S/N 0102-014-6600

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Report Number 70-13, January, 1970, supported by the Bureau of Medicine and Surgery, Department of the Navy, under Research Task MF51.524.002-5015DX5F.

Factors Affecting the Stability of Job Attitudes in Long-Term Isolated Groups

Job satisfaction has been found to correlate with many characteristics of individuals and work situations. Generally, job satisfaction and performance may be viewed as separate outcomes of a complex set of factors determining work behavior and attitudes; in certain situations job satisfaction and work effectiveness have been found to be related. In isolated Antarctic groups Doll and Gunderson (1969) found that occupational role functioned as a moderator variable in the relationship between job satisfaction and job performance; job satisfaction was positively related to work effectiveness for scientists but not for Navy support personnel. Whether related to job performance or not, job satisfaction is regarded as one of several important components of personal adjustment at Antarctic stations.

Factors related to stability or change in job satisfaction over extended periods of time have not been thoroughly investigated. This study is concerned with the effects of occupational role, group size, and status level upon job satisfaction measures in scientists and Navy personnel during long-term isolation and confinement. Measures of attitudes toward job assignments in the Antarctic research program were obtained before and during deployment to Antarctica over a period of approximately 18 months.

Method

Subjects. Subjects were 231 Navy enlisted personnel and 140 civilian

scientists and technicians who participated in the United States Antarctic research program during 1963-1968. Of the Navy support personnel 125 were in construction jobs (Seabees) and 106 were in technical or administrative jobs. The mean age of both scientist and Navy groups was 27 years. Most of the Navy men had completed high school (59%), and two-thirds of the scientist group were college graduates.

Procedure. Job attitude measures were administered during routine psychiatric screening prior to deployment to Antarctica and again on two occasions during the Antarctic winter. Station members were completely isolated from the outside world except for radio communication from February to November.

The contents of the screening and Antarctic job attitude scales are shown in Table 1. Construction of these scales was based upon repeated factor analyses which are described elsewhere (Shears and Gunderson, 1966). Most of the items in corresponding screening and Antarctic measures are virtually identical in content except for necessary modifications due to the test situation; the remaining items correlated very highly with the scale as a whole or had high loadings on the respective factors. The screening version of the job satisfaction scale is labeled Motivation while the Antarctic version is labeled Job Morale in order to be consistent with previous usage. Both screening and Antarctic versions of the second scale are labeled Job Importance.

Pay grade or rank is a direct and unambiguous measure of occupational status in the military situation. For the civilian participants in the Antarctic program educational level is the best indicator of occupational status as the hierarchy of responsibility and authority in the scientific

program is directly tied to education. Rank and education level, therefore, provided appropriate measures of occupational status for Navy personnel and scientists, respectively.

The following relationships were examined in the study: (1) relationships between screening job attitude measures and later Antarctic measures; (2) the test-retest stability of Job Morale and Job Importance measures during the winter; (3) the interdependence of Motivation/Job Morale and Job Importance measures at different time periods; (4) relationships of occupational group and station size to Job Morale and Job Importance, and (5) relationships between status level (rank or education) and job attitude measures. Finally, the significance of changes in Job Morale and Job Importance during the winter months was evaluated. Analyses were conducted separately for three major occupational subgroups which have been found to differ on a wide array of social background, educational, and psychological characteristics (Gunderson and Mahan, 1966). These subgroups were: (1) Navy construction personnel (Seabees), (2) Navy technical and administrative personnel (Technical-Administrative), and (3) civilian scientists and technicians.

Results

Relationships between screening measures and later Antarctic measures are shown in Table 2. Motivation scores were substantially correlated with both early and late winter Job Morale scores for the scientist group ($p < .001$). Motivation was significantly correlated ($p < .05$) with Job Morale at early winter, but not late winter, for the Navy Technical-Administrative group. The same scales were not significantly correlated at either time period for the Navy Construction group.

Correlations between the Job Importance scales (screening vs. winter) generally were lower than those between Motivation and Job Morale. The screening measure correlated significantly with Job Importance at late winter, but not early winter, for the scientist group ($p < .05$) and at early winter, but not late winter, for the Navy Technical-Administrative group.

Test-retest correlations over the winter months were very high for the civilian group on both scales (.79 for Job Morale and .72 for Job Importance). Test-retest coefficients for the Technical-Administrative group were .58 and .65, respectively, and for the Construction group, .54 and .53, respectively. Thus, the degree of stability in job attitudes during seven months of isolation was substantial for all three occupational groups; the test-retest stability for the civilian group was much higher than that for the Construction group, however.

The interdependence of Job Importance and Job Morale for the three occupational groups and the three time periods is shown in Table 3. Looking at the results by time period, it is evident that the two scales correlated highest at screening for the Navy Construction group and lowest for the civilian group, although differences were not large. At early winter the two scales correlated equally for the three groups. At the end of winter there had been a reversal in the order of magnitude of the correlations; the two scales correlated much more highly for the civilian group than for the Navy Construction group.

Looking at the results in Table 3 by occupational group, the civilian group showed a large increase in the magnitude of correlation from screening to late winter while the Navy Construction group showed a slight increase from screening to early winter and a decrease from early to late winter. The

Technical-Administrative group showed slight increases in correlation from screening to early winter and from early to late winter.

Navy personnel as a whole had lower Job Morale scores than did civilian personnel both at early winter ($t = 4.76$, $p < .001$) and late winter ($t = 6.94$, $p < .001$). The difference was more pronounced at the end of winter.

Job Importance scores did not differ significantly between Navy and civilian personnel at either time period.

Differences between large and small stations for Navy and civilian groups combined were not significant for either scale at either time period. Mean attitude scores by occupational group, station size, and time period are shown in Table 4. Significance of differences (t-tests) for a number of comparisons by occupational group and station size are shown in Table 5. When Navy personnel at large and small stations were compared, the difference between large and small station groups was significant ($p < .05$) only for Job Importance at early winter; large station personnel perceived their jobs as more important than did small station personnel.

For the comparisons of large station and small station civilian personnel, only the difference on Job Morale at early winter was significant ($p < .01$); small station civilians had higher satisfaction at that time than did large station civilians.

Job Morale scores were significantly higher for the civilian group than for the Navy group at both large and small stations and at both time periods.

At large stations the Navy group scored higher than civilians on Job Importance at early winter ($p < .05$), but the difference between these two groups was negligible at the end of winter. At small stations the relationship was the reverse at the beginning of winter in that civilians scored

higher on Job Importance than did Navy personnel ($p < .05$). The difference at the end of winter was not significant.

The significance of changes in Job Morale and Job Importance was tested by means of t-tests for correlated means. Differences for four groups were examined: Navy large station, civilian large station, Navy small station, and civilian small station. The difference for the Navy large station group on Job Morale was highly significant ($t = 4.81$, $p < .001$), indicating some deterioration in personal satisfaction for Navy men during the winter. There was no change in Job Morale for civilian personnel at large stations from early to late winter.

In similar fashion feelings of job importance declined significantly during the winter for Navy personnel at large stations ($t = 5.53$, $p < .001$), but no change was recorded for civilian scientists.

At small stations Navy personnel again showed a significant decline in Job Morale ($t = 2.91$, $p < .01$) but no similar change in Job Importance.

Relatively few civilians at small stations were included in the analysis, and the small changes recorded in Job Morale and Job Importance did not approach statistical significance.

Discussion

The results seem clear on a number of points. There was relatively high consistency in job satisfaction measures throughout the 18 months of involvement for the civilian scientist group. The consistency was much less for the Navy personnel; in fact, there was no relationship between measures at screening and measures at the end of the year in Antarctica. Job satisfaction, therefore, was quite predictable from predeployment attitudes in the scientist group, but only slightly, if at all, predictable in the Navy group.

It was clear that Job Morale and Job Importance became more interdependent in the scientist group during the winter period and at the same time became less interdependent for the Navy Seabees. This finding would seem to be at least partially explained by the different types of tasks performed and the seasonal nature of the work in Antarctica for the Navy personnel. The Navy mechanics and construction personnel in particular work extremely hard early in the year and their jobs are very demanding. During the latter part of the winter work activities for the Navy construction personnel generally are greatly reduced. The scientists, on the other hand, tend to have more stable work programs throughout the year.

Overall, the most positive attitudes were expressed by civilian personnel at small stations, and the most negative attitudes were expressed by Navy men at small stations. Thus, there appeared to be some interaction between occupational group and station size in the determination of attitudes although this effect was not pronounced.

Navy men showed significant deterioration in morale or satisfaction through the winter regardless of station size while civilians reported little or no change. Occupational role, therefore, was an important determinant of job satisfaction under conditions of long-term isolation and confinement.

It was demonstrated that status level, as measured by education or pay grade (rank), significantly affected feelings of job importance, but again occupational group functioned as a moderator of this relationship. In the civilian and Technical-Administrative groups, Job Importance scores were negatively correlated with status level at late winter, indicating that individuals with higher status felt more acutely that their work efforts had less value hear the end of winter. This finding seems consistent with the fact

that opportunities for work achievement, particularly of a highly technical or complex nature, are very limited in this extremely restricted environment.

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Table 1

Composition of Screening and Antarctic Scales

Screening	Antarctic
Job Motivation	**Job Morale**
1. Being part of an Antarctic expedition will be the highlight of my career.	1. Being part of an Antarctic expedition is the highlight of my career.
2. I would like to stay in the Antarctic longer than now planned.	2. I wish I could stay in the Antarctic longer than now planned.
3. Most of the people who go to the Antarctic will probably wish they had stayed in the U.S.	3. I often wish I had never come to the Antarctic.
4. A large proportion of the people I know would like to go to the Antarctic.	4. I would like to go on another Antarctic expedition in the future.
5. I like the idea of waiting several months before we go to the Antarctic.	5. I am happier with my job here than I was in my last assignment.
	6. Time passes too slowly in the Antarctic.
Job Importance	**Job Importance**
1. The knowledge and experience I gain from an Antarctic expedition will help me advance in my career.	1. The knowledge and experience I gain from this expedition will help me advance in my career.
2. In the Antarctic I will contribute more for the U.S. than I would at most other assignments.	2. In the Antarctic I am contributing more for the U.S. than I would be at most other assignments.
3. I think I can contribute more on this expedition than most people can.	3. I feel that I am contributing as much on this expedition as others are.
4. I believe I can make or help others make valuable scientific findings in the Antarctic.	4. The success or failure of this station depends as much on my job as any other.
5. I would advise a friend who was considering joining a Polar expedition to apply for the type of job I will have in the Antarctic.	5. My job here is important enough to justify my spending all this time in the Antarctic.
	6. My present duties employ my abilities in the best possible way.

Table 2

Correlations between Screening and Antarctic Attitudes Scales

Group	Screening Scale	Job Morale (Antarctica)		Job Importance (Antarctic)		Number of Cases	
		Early Winter	Late Winter	Early Winter	Late Winter	Early	Late
Civilians	Motivation	.45[a]	.43[a]	-	-	102	83
	Job Importance	-	-	.20	.26[b]	100	82
Technical-Administrative	Motivation	.24[b]	.20	-	-	73	70
	Job Importance	-	-	.29[b]	.13	73	70
Construction	Motivation	.19	.00	-	-	86	77
	Job Importance	-	-	.11	.06	87	78

[a] $p < .01$

[b] $p < .05$

Table 3

Correlations between Motivation/Job Morale and Job Importance for Three Groups and Three Time Periods[a]

	Screening	N	Early	N	Late	N
Civilian	.26	140	.34	102	.54	90
Technical-Administrative	.31	101	.35	75	.36	72
Construction	.37	115	.39	93	.28	84

[a]All coefficients are significant beyond the .01 level, two-tailed test.

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Table 4

Job Attitude Mean Scores by Occupational Group, Station Size, and Time Period

		Job Morale		Job Importance	
		Early Winter	Late Winter	Early Winter	Late Winter
Navy:					
Large Station	Mean	15.32[a]	12.87	23.44	20.97
	S.D.	5.99	6.13	5.13	5.79
	N	133	127	134	127
Small Station	Mean	15.00	10.00	20.73	20.29
	S.D.	7.54	6.55	5.17	5.39
	N	22	24	22	24
Civilian:					
Large Station	Mean	18.32	18.51	21.94	21.24
	S.D.	5.63	6.65	4.81	4.73
	N	88	71	86	72
Small Station	Mean	21.18	19.08	23.94	22.08
	S.D.	4.33	6.99	3.49	6.95
	N	17	13	17	13

[a]The attitude scales are scored so that high scores indicate high job morale or high job importance.

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Table 5

Significance of Differences (t-tests) by Occupation, Station Size, and Time Period

Comparison	Job Morale		Job Importance	
	Early Winter	Late Winter	Early Winter	Late Winter
NAVY:				
Large vs. small station	.19	1.95	2.23[a]	.55
CIVILIAN:				
Large vs. small station	-2.31[a]	- .26	-1.96	- .40
LARGE STATION:				
Navy vs. civilian	-3.76[b]	-5.84[b]	2.18[a]	- .35
SMALL STATION:				
Navy vs. civilian	-3.14[b]	-3.76[b]	-2.25[a]	- .78

[a] $p < .05$

[b] $p < .01$

UNCLASSIFIED

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6 REPORT DATE	7a TOTAL NO OF PAGES	7b NO OF REFS
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DD FORM 1 NOV 65 1473 (PAGE 1) PLATE NO. 21856

S/N 0102-014-6600

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Table 6

Correlations between Status Level and Attitude Measures

Group and Status Measure	Screening			Early Winter			Late Winter		
	Motivation	Importance	N	Morale	Importance	N	Morale	Importance	N
Civilian (Education)	.15	-.09	138	.07	-.20[a]	104	-.15	-.34[b]	85
Technical-Admin. (Rank)	-.11	-.11	101	.06	-.12	75	-.02	-.28[a]	72
Construction (Rank)	-.13	.12	115	-.18	-.20	92	-.19	-.20	84

[a] $p < .05$

[b] $p < .01$